

**What Is Claimed Is:**

1. A *maoC* gene coding for a MaoC protein of SEQ ID NO: 1.
- 5        2. The *maoC* gene according to Claim 1, which has a DNA sequence of SEQ ID NO: 2 and codes for a protein which provides monomers required for the synthesis of middle-chain-length polyhydroxyalkanoate (MCL-PHA).
- 10      3. A recombinant vector containing the gene according to Claim 1.
4. A MaoC protein, which has an amino acid sequence of SEQ ID NO: 1 and shows enoyl-CoA hydratase activity.
- 15      5. A microorganism transformed with the recombinant vector according to Claim 3.
6. The transformed microorganism according to Claim 5, which is deleted of a *fadB* gene and which contains a PHA synthase gene.
- 20      7. The transformed microorganism according to Claim 6, which is transformed with a recombinant vector containing the PHA synthase gene or in which the PHA synthase gene is cloned into a chromosome.
- 25      8. The transformed microorganism according to Claim 6, in which the PHA synthase gene is *phac*.

9. A method for producing middle-chain-length polyhydroxyalkanoate (MCL-PHA), which comprises the steps of:

(i) culturing the microorganism according to Claim 6 in a medium containing a C<sub>6-10</sub> carbon source; and

5 (ii) obtaining PHA consisting of monomers with 6-10 carbon atoms.

10. MCL-PHA which is produced by the method according to Claim 9 so that the content of each of 3-hydroxyoctanoate (3HO) and 3-hydroxydecanoate (3HD) is more than 30 mol%.